The Japanese reference of JP2-305832 discloses a method of using 1:2 metallic azo complex dye represented by the formula [I] (which is identical to the formula [II] in Claim 2) for coloring thermoplastic resin such as polystyrene, polyacrylic general-purpose engineering plastics, polyamide, polyester, polyacetals to be used in molding at relatively high molding temperature without sublimation and fading. The reference is concerned only in passing with 1:2 metallic azo complex dye, being preferred among the conventional oil soluble dyes being used when coloring plastics. Applicants suggest that such a disclosure hardly amounts to recognition that the most desirable transmission coefficient of articles of thermoplastic composition comprising 1:2 metallic azo complex dye for the near-infrared spectrum of a laser beam having a main wavelength from 1200 nm to 800 nm in a laser welding (in which two articles of resins (one colored and opaque for the laser beam and the other colored and transparent for the laser beam) are joined together by being positioned in contact with each other and being transmitted a predetermined amount of laser beam energy focused on the area of contact) can be attained.

The Japanese reference (Japanese patent 2841077) is actually the resulting patent from the first Japanese reference and this reference substantially the same method as that disclosed in the first reference. The comments given in immediately preceding paragraph therefore also apply to this reference. Lienhard et al. 4,263,197 discloses a method of using salts of 1:2 chromium complexes of monoazo dyes represented by the formula (2) (which is identical to the formula [I] in Claim 2) for dyeing liner polyamide resulting into improved fastness to light, wet processing, rubbing and thermofixing. Lienhard et al. 4,527,994 discloses the same 1:2 chromium complex azo dye for mass-coloring nylon. Neither reference discloses that transmission coefficient of articles of thermoplastic composition comprising 1:2 metallic azo complex dye for the near-infrared spectrum of a laser beam having a main wavelength from 1200 nm to 800 nm can be significantly improved without adversely effect on other.properties of the thermoplastic composition required resulting into joining a transparent article molded therefrom with an opaque article for the laser beam, both having the same color of black by the laser welding process.

Zwahlen et al 4,093,584 discloses a process for the mass colouration or whitening of liner polyesters, by mixing with a preparation consisting substantially of a colourant or fluorescent brightener which is soluble or insoluble in the polyester, and of a polystyrene with a softening point above 100 °C, melting the resultant mixture and forming into shaped articles which are evenly and deeply coloured and having good fastness to light. There is no disclosure a significantly improved transmission coefficient of articles of thermoplastic composition comprising 1:2 metallic azo complex dye for the near-infrared spectrum of a laser beam having a main wavelength from 800 nm to 1200 nm in a laser welding.

Riegler et al 4,094,839 discloses a preparation for coloring molten thermoplastic polymers containing a pigment or a polymer-soluble colorant including 1:2 chromium or cobalt complexes of monoazo dyes and a carrier of metal salts containing cations such as calcium, barium, zinc, aluminum, and magnesium. Riegler et al fail to disclose the 1:2 metallic azo complex dye being transparent for the near-infrared spectrum of a laser beam having a main wavelength from 800 nm to 1200 nm in a laser welding, as claimed.

Yeh 4,853,272 discloses flame retardant fibers made from synthetic polymers such as polyolefins, polyamides, polyesters, and mixtures thereof incorporating organic pigments such as a chromium 1:2 complex azo dye. The quantity referred to in Yeh relates to a flame retardance, rather than the claimed transparence for the near-infrared spectrum of a laser beam having a main wavelength from 800 nm to 1200 nm in a laser welding. In the claim 5 of the present application, the amount of the 1:2 metallic azo complex dye used in the present application is in the range from 0.01 to 1% by weight based upon the total weight of the claimed composition, these two quantities are unrelated.

Bable et al 5,075,195 discloses a method of laser marking plastics objects of any desired shape by undergoing a change in colour, losing colour, decomposing , or effecting a change in colour as a result of absorption of the laser energy by radiation-sensitive additive comprised in plastic materials. Applicant respectfully submits that Bable et al provide no information relevant to improving transmission coefficient of

articles of thermoplastic composition comprising 1:2 metallic azo complex dye for the near-infrared spectrum of a laser beam applied in the laser welding being totally different from the laser marking.

Faber et al 5,489,639 discloses similar laser markable thermoplastic composition to that disclosed in Bable et al, and the comments given in immediately preceding paragraph therefore also apply to this reference.

Applicants conclude that none of the citations either taken singly or in combination disclose or render obvious the present invention.

For the reasons set forth hereinabove, it is believed that this application clearly and patentably distinguished over the prior art and hence is in proper condition for allowance.

RESPECTFULLY SUBMITTED,

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Date: JAN 22 2003

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In showing the changes, deleted material is shown as bracketed, and inserted material is shown underlined.

IN THE SPECIFICATION:

Page 3, lines 6 and 7:

Moreover, there are disclosed and claimed therein **[themoplastic]** **thermoplastic** resin compositions for laser welding comprising:

Page 10, line 25:

Page 13, lines 25 to 30:

Dye-A:**[1:2 type metallic azo complex salt dye]** 1:2 metallic azo complex dye having the formula [[2]] (2)

Dye-B: Sumiplast Black H3B

Dye-C:Nigrosine

Dye-D: carbon black

Dye-E: [1:2 type metallic azo complex salt dye] 1:2 metallic azo complex dye having the following formula [4]

Page 13, lines 13 to 18 and page 14, lines 1 to 5:

Example 4

400 grams of (unreinforced) Nylon 6 ZYTEL pellets (available from E.I. DuPont de Nemours and Co.) were dried under vacuum at 120°C, for more than 8 hours, then mixed with a mixture of **black** metal azo complex dye A (represented by formula **[[2]]** (2)(0.67 g) with **yellow** metal azo complex dye E represented by the formula [4] (0.13 g) in a stainless tumble mixer with stirring for one hour. The mixture was then injection molded to form the injection molded test specimens (whose sizes are 48 mm x 86mm x 3 mm) using K50-C produced by Kawaguchi Steel K.K. and the cylinder temperature was set to 250°C. Mold temperature was 60°C. Good and uniformly black appearance and surface gloss without color shading of the specimens were observed.

Page 14, lines 9 to 19:

Unreinforced Nylon 6 ZYTEL pellets (available from E.I. DuPont de Nemours and Co.) were dried under vacuum at 120°C, for more than 8 hours, then mixed with

a mixture of **black** metal azo complex dye A (represented by formula **[[2]]** **(2)**) with **yellow** metal azo complex dye E represented by the formula [4] in amounts set forth in Table 2 in a stainless tumble mixer with stirring for one hour. The mixture was then injection molded to form the injection molded test specimens (whose sizes are 48 mm x 86mm x 3 mm) using K50-C produced by Kawaguchi Steel K.K. and the cylinder temperature was set to 250°C. Mold temperature was 60°C. Good and uniformly black appearance and surface gloss without color shading of the specimens were observed. Transmission properties, appearance and surface gloss were measured by the following test procedures:

IN THE CLAIMS:

1. (Amended) A composition suitable for laser welding comprising a thermoplastic resin and a 1:2 **[type]** metallic azo complex dye **being transparent for the near-infrared spectrum of a laser beam applied in said laser welding having a main wavelength from 800 nm to 1200 nm.**

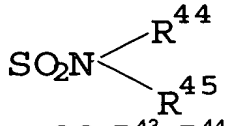
2. (Amended) A thermoplastic resin composition for laser welding comprising

1) at least one thermoplastic resin; and,

2) a black colorant having at least one of **1:2 metallic azo** **[the metal azo]** complex dyes of the following formulas, said 1:2 metallic azo complex dye **being transparent for the near-infrared spectrum of a laser beam applied in said laser welding having a main wavelength from 800 nm to 1200 nm**:

The formula [I]

Wherein R^{39},R^{41}, which may be the same or different, are Cl,

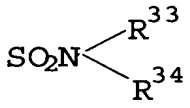


,or SO_2R^{43}, R^{44}, R^{45}, which may be the same or different, are independently hydrogen atom, **linear [liner]** or branched C1-C4alkyl, $R^{43}$is linear or branched C1-C4 alkyl, R^{40}, R^{42}, which may be the same or different, are hydrogen, liner or branched C1-C18

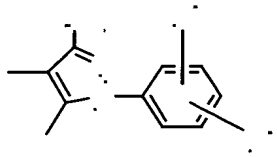
alkyl group, **linear [liner]** or branched C2-C18alkenyl group, sulfonamide group, carboxyl group, mesyl group, hydroxyl group, C1-C18 alkoxy group, acethylamino group, benzoylamino group, a halogen atom or -CONH-R^{46}, R^{46} is functional group selected from unsubstituted or substituted **linear [liner]** or branched C1-C18 alkyl or unsubstituted substituted C6-C18 aryl group, L_1 and L_2 are independently O or COO, $(E)^+$ are H^+; cation of alkali metal, ammonium ion, cations of organic amine including aliphatic primary, secondary and ternary amines, quaternary ammonium ion.
, K^3 is an integer, m^3 is 0,1 or 2,
M^1 is a kind of metals[, preferably metals] having coordination numbers of from 2 to 4 **[, more preferably trivalent metal such as Cr, Fe, Cu]**;

The formula [II]

wherein $R^{30}$and R^{31}, which may be the same of different, are Cl,

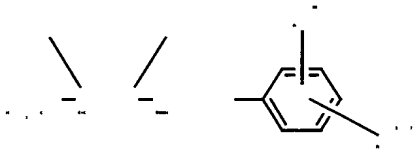


SO_2R^{32}, or H,
$R^{33}$and R^{34}, which may be the same or different, are independently hydrogen atom, linear or branchedC1-C4 alkyl,
R^{32} is linear or branched C1-C4 alkyl, L_3 and L_4 are independently O or COO,
$(D)^+$ is hydrogen ion, cation of alkali metals, ammonium ion, cations of organic amine including aliphatic primary, secondary and ternary amines, quaternary ammonium ion,
K^2 is an integer,m^2 is 0,1 or 2,
M^2 is metals of atomic numbers of from 2 to 4 **[such as Zn, Sr, Cr, Al, Ti, Fe, Zr, Ni, Co, Mn, B, Si and Sn, preferably metal of atomic numbers of 3 such as Cr, Co, Cu, Ni, Al]**,
B is represented by formula



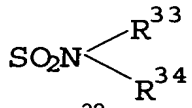
-----[III]

or



-----[IV]

wherein R^{35} and R^{37}, which may be the same of ifferent, are Cl,



, SO_2R^{32} , or H,

R^{33} and R^{34} , which may be the same or different, are independently hydrogen atom, linear or branchedC1-C4alkyl, and R^{36} and R^{38}, which may be the same or different, are independently hydrogen atom, linear or branched C1-C18 alkyl, carboxyl, hydroxyl,C1-C18 alkoxy, amino or halogen atoms.

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